Panel Discussion

Introduction by Ed Squiers

I certainly really appreciate your final comments, Anna. Using the information–that's one of the big endeavors of the Indiana Wetland Conservation Plan–to take the scientific information and apply it to the decision making process. I couldn't agree more.

Now we're going to have a panel discussion, and you can direct your question to a specific person here on the panel, or to the whole panel and have them respond individually. This is a chance to share your ideas and questions about the things that were discussed this morning. So if anyone has questions, fire away.

Question:
The intent here is trying to develop some type of assessment technique. I know I've talked to Brett at length about some of the objectives of what a technique like that may be. And I spent a very short period of time working for John some years ago, and came to know a little bit about the evaluations that they went through in developing an assessment technique for evaluating new properties. With the changes in properties that you might be looking at or potential for restoration versus the more purer sites, is there an overlap between the assessment techniques that'll work for both agencies?

Dan Smith
Well, if you're asking my opinion on that, I believe so. As I mentioned earlier, I believe that one of the objectives of this is to examine the existing techniques that are out there, which is what we're doing in a broad sense here today. We're going to get into discussion of this very question tomorrow afternoon, so I'll save a little bit of that for then, but, Ed's group is going to be looking at the existing methodologies that are out there, and distilling from those methodologies measurements that will be useful for us here in Indiana. Application, I believe, from there, could be universal. That's my opinion, that the functional assessment itself is just merely a tool to measure different functions that this particular wetland is providing. From that, you make value judgements for your own regulatory or non-regulatory purposes. That's my opinion, I don't know if that's too simplistic a view, but I'll let John respond to that as well. We'll be diving into greater depths tomorrow afternoon, after we've looked at a few of the other states' approaches to it.

Tom Danielson
I would add that the army of trained agency staff is coming up with some very interesting information. And my hope is that we can learn more and that we can set priorities as we try to synthesize this data, and that we can work with the other divisions and other agencies and partners. For instance, IDEM is working on outstanding waters designations right now. And to come to that conclusion, there's quite a bit of field sampling involved. That kind of field

sampling's going to yield a lot of interesting data. Most of our expertise is botanical. And we do the best we can to glean anything we can from the experts (like the entomology department) to help us make decisions. And we would try to partner in the acquisition of special areas for whatever reason, but we don't have the expertise. So I think this will help along those lines.

Question:
I know that we don't have any kind of banking agreement in Indiana, but let's say that we do get something worked out and then this HGM approach becomes the accepted method for delineation and so forth. How can we debit and credit for functions from a bank. I mean, how do you see that happening? Or do you see that happening?

Tom Danielson
On a cursory level, yes, and we currently are. I can give a little more background without spending a great deal of time on the banking issue. Currently, the Louisville Corps of Engineers district is the lead agency in Indiana, and they have a directive from Washington to work on bringing all the partners together–the U.S. Fish & Wildlife Service, Indiana DNR, IDEM, and NRCS–to form a Coordinated Agreement, or ICA. I can't remember the actual title, but the acronym is ICA. This is an agreement that's being worked out for guidelines, basically, on mitigation banking and how that'll work. Now, how wetland assessment would tie into that, is really the same that would apply to regular mitigation sites. In other words, if we want to allow an impact to a wetland and we want it to be mitigated for, by mitigating for a suite of specific functions that that wetland's providing in that watershed, then we may or may not, depending on the project. If it's something that we can prove with mitigation, we may likely look at onsite mitigation as the first option, and then move into offsite options, depending on the circumstances. I don't have a lot of familiarity working with the bank; we don't have any "current" banks.

Question:
Even with onsite mitigation, you say this is an acre of wetland, and the whole acre functions in this way and half of the acre functions in that way. And we're used to replacing the area that we've impacted. But how do we then replace for the exact capacity of that function?

Dan Smith
I can partly respond to that, at least from the context of HGM. That's done through what we call a functional capacity unit, and it's just the functional capacity index multiplied by the acreage. That gives you a unit much like habitat units. So it becomes unit-based. That's the medium of exchange in a mitigation bank and mitigation requirements.

Question:
So for a bank, you could have one acre that's 3 functions, you could actually debit that acre 3 times for...

Anna Smith
In HGM, the analysis is done on a function by function basis. In other words, you get 10 different indices. At some point, you jump over to this value side of it. You may decide that a certain function is the most important, therefore you will weigh that one more importantly. So there's lots of different ways to do the accounting. HGM gives you the measure of what you gain or what you've lost. What you do with that is really a social decision–HGM doesn't help you there. That's kind of a decision you have to make.

[New Speaker]
That may be the 24,000 dollar question in all of this–the shift. As someone pointed out, it's the value/function kind of watershed. In a sense, what is it worth to society to have a particular kind of function replaced, and how much should we replace? You people, I suspect, are stuck with coming up with that kind of accounting without any interface. I think that's part of what we're all here for–to begin to think about these things together. There are other watersheds, We've got 2 ends correct, one is biodiversity and the other is what the Corps has always done, which is basically hydro-geomorphology, the lay of the land and the way water flows. And we're asking the same question from both ends of this spectrum. I think probably we argued with the extremists in our own organization enough, and we backed away from them, and we finally bumped into each other. John and his counterpart found themselves standing together with different methods, but asking the same type of questions. We may be at a point now where we're trying to sort that out. So I think we've ended up with values questions, we've ended up with functions questions, then we've ended up with these practical questions that you raise: how do I actually do this? Now, this is really nice. I know I've got these indices and I've got these numbers, now I've got to actually go out into the field and say to a contractor, you just destroyed x acres of something, we have to decide what that is, and what that means–functional value–and this is what you have to do to break even, to satisfy us in a legal sense. We're dealing with all 3 of those.

Anna Smith
The Corps does have wetland banking case studies on their website.

[New Speaker]
Any particulars on that site, Dan?

Dan Smith
The way it's currently set out is acre for acre, and then in developing prospective plans, the management and operations of that bank as proposers need to possibly identify HGM or functional assessment that the state may be working on, as something that may be implemented later to accrue credits for the value of the bank. But at this point it's strictly acre for acre, and the benefit you get from the bank might be a lower ratio of mitigation, replacement, for an established wetland. That's why they established it.

Question:
In my position with the Nongame Program, the reptile and amphibian experts are often concerned that we are losing the ephemeral wetlands, which are very important to breeding amphibians, in particular. And as I listened to each of the 3 assessment methods, it wasn't clear to me how those methods fit with the ephemeral wetland. So I guess I'm asking the 3 speakers if they'd like to comment regarding their assessment methods and the ephemeral wetland.

Anna Smith
In the case of HGM, it's a pretty easy answer, I think. It's how you decide to classify the wetlands in your region. If you decide that ephemeral wetlands are not valuable or not valuable enough to include as a regional subclass, then you've basically said, they're not important to us. Therefore, forget the rest of HGM. In California they have a big controversy about ephemeral systems. They have decided that it bears defining as a regional subclass–maybe 2 or 3 subclasses as you go geographically from northern California to southern California. A regional guidebook is being developed that, as you might expect, is focused very highly on some of the invertebrate species that are present in those systems. So from an HGM perspective, it really depends and is very flexible. If you decide that's important, you can define it as a regional subclass and develop a regional guidebook for it.

[New Speaker]
That last phrase is what's giving everybody fits–"develop a regional guidebook for it."

Anna Smith
I told you it's not easy. I said it's simple, but it's not easy.

Question:
I have a question for Anna or possibly Tom. Your studies show that there are clear problems with the biological diversity when you get above 10 or 15 percent impervious surface. Given that, in urbanizing areas, there is going to be an increasing percent of impervious surface, are we in a losing game here? Just by way of example, I have people in the city area telling me that we may as well forget about maintaining biodiversity in the wetlands within some urban core, and instead make up for that with wetlands outside on the fringe. And I'm just curious as to how you would respond to that.

Anna Hicks
I can give you the opposite example where over in Oregon they have very forward-thinking town planning and land use management practices, and over on the northwest coast areas, they're talking about reducing the amount of impervious surface in urban areas. In fact, they are digging impervious surfaces up and replacing surfaces in order to improve water quality of wetlands and streams and rivers. I don't think you should turn your back and say it's too late, it's shot, its gone. Not only that, but with every new development that comes up, yes you may slowly be degrading, I think we're going to have to be realistic, but why go the whole hog? Why not put in field

planning development projects, areas of best management practices, that alleviate some of the impacts. Break it up, use different surfaces, do different techniques, put it into big planning and mitigate. Again, the problems that would come due to the old fashioned way. It's time to become a little more effective, to look at alternatives. Best management practices is the way people are now going, when you have to put out this continued development to try and soften the blow. You're not going to eliminate the blow but you can soften it.

Tom Danielson
I agree wholeheartedly. It seems like our society is recalcitrant to rethink the way we do things at times. And I think if we can do a better job planning our development, using better surfaces. I think writing it off is the worst thing you can do. As far as the effect on wetlands, a lot of states are doing that work in ephemeral wetlands now; as long as they have standing water, they just go during that time of year. North Dakota and Montana particularly, are looking at seasonal "potholes," where there are annual drawdowns, and they're looking at a variety of macroinvertebrates, algae, plants, and amphibians, so they're definitely looking at that.

Question:
One of the things that was addressed today was that at least with both of the methodologies, you could develop a suite of indicators not just for biological integrity or functions, but a suite of indicators for human disturbance. And I heard some fairly clear, well-defined indicators for urban disturbance, and I wonder if any of you are aware of similar indicators for rural or agricultural disturbance.

Tom Danielson
There are a few–the states out west are looking at primary indicators of non-urban related, but agricultural or logging. And one of the thresholds they look at is percentage of watershed around the wetland which has been logged, and they will do a scatter plot and find that there's something missing. So then they'll add a certain distance to the nearest road, or how many logging roads are there, and that adds a lot of information. So the human element is a big problem to deal with. What do you use for that? But I think people focus on that too much. I think that is the part where we have the least amount of knowledge about all the impacts that are going to impact the biology. What we really know (at least with the biological assessment) is the biological investment; where are we going to get the information? So we can try different gradients on the x-axis, but we know what the biology is. And the key is, just trying to find out which metrics are going to show those consistent relationships to a variety of those human impacts.

Question:
Ed, this is a question for you, as a professor. What Anna said–the idea of being creative–is, I think, a key here. I work with a lot of engineering firms, and I don't see a lot of creativity. And I wonder, are the natural resource schools getting with the schools of engineering in our universities–connecting these together to require engineers to take some courses that would make them able to try and understand the biologist's perspective a little better?

Ed Squiers
I think it's beginning to happen. I think the problem in universities is much like the problem in governments: it's very hard to cross departmental lines. Usually the curriculum is full. In government, you're all busy. And now we want you to go take a course in another area, and you tend to have a lot of turf battles. I've been playing the game 25 years, and I can say for sure that it's improved in the last 25 years, but there's still an awful lot of turf battles, and there's a difference in world view between engineering and ecology. The field biologist mentality is very different from the mentality that produces the engineer. They're almost theological differences. If you get right down to it, it's the way you view the world. That's a challenge. Just a general example, most biologists are math-phobic. Most engineers love math. Most engineers want precision. Most biologists are happy in a world that's 10 percent plus or minus. If you can get that close, it's great. Engineers like things that are dead and mechanical, biologists like things that are alive, changing all the time. And that's the kind of thing you have to break through. I think biologists are learning to be more like engineers, which may or may not be a good thing, and engineers are learning, to a degree, or being forced to learn in many cases, to think more like biologists. But you're absolutely right, it should be done. There are a few really innovative programs that are trying to do it, and generally, many of the old school engineering programs, and many of the old school natural science programs give those new innovative programs a hard time. You're not viewed as legitimate if you're an engineer and you nod heavily toward the ecological, or vice versa. So that's a struggle.

[New Speaker]
Let me add to that, because I asked that very question in a business community, and they pointed out that engineers are held to standards. If they build something and it doesn't work, then they're liable, more so than maybe we're used to being. So that causes change in the engineering community to go slower because somebody else has got to put their neck on the line, so to speak, to find those new methods and to make sure they are going to be safe. If you're building a bridge, you have to have those standards that are justified. And when you deviate from that, you are professionally at risk. Hearing that put a whole new light on it for me. I was hoping it would increase communication, but it may be slower than you might anticipate because of those constraints on them.

Ed Squiers
And the biologists and ecologists, are just now getting dragged into court because of failures of their methods. You heard it in the discussion today, a speaker said that a certain method would hold up in court. There needs to be a numerical scheme, because that's what the certifiers are used to. I'd much rather do the engineering math to send a man to the moon, than I would to try to tell you exactly what a good wetland is.

Question:
When you look at the invertebrate communities on these investigated wetlands, are you seeing a strong correlation with the vegetative composition itself, or with more structural sorts of things?

Anna Hicks
Structural. One thing is that the invertebrates use vegetation in many different ways. There are certainly invertebrates that chew directly on vegetation, but it's very rarely species-specific. If the vegetation is very soft and non-woody, it's potentially good food value to the invertebrate. Invertebrates use vegetation also for habitat, in terms of being able to cling, to be able to avoid predators, for egg-laying sites, and various other activities, apart from just using vegetation as a food source. You can certainly have a monoculture, such as a salt marsh, which is extremely healthy, and supports a wide variety of invertebrates. But if you had a forested wetland, which has very coarse cellular material that's hard for invertebrates to use as a food source, you're probably going to have a diminished diversity, and probably a diminished number of organisms. And you have to always know the background biology to your community and its surrounds. Once again, know the relationship, so if you are in a forested wetland, and you do get a diminished variety than something that you're more used to in a different community, it doesn't mean that it's impacted. You have to look more deeply and say well, why is it diminished in terms of what I would look for in a good quality wetland? And make sure that you're making the right judgement. Understand the ecology. Vegetation is a very important component of wetlands. Wetlands are not wetlands without vegetation. That is to say, you can have a healthy wetland with one mono-type, and a healthy wetland with enormous diversity. In my system, invertebrates will respond with some tolerance to nutrification, and usually the vertebrate bio-monitoring system comes up with not terribly much vegetation. Remove that vegetation, and yes, you're going to remove the invertebrates, because that is one of the bases there, for the whole community. You do have to know some biology to be able to interpret your results correctly.

Question:
What kind of incentive does the state of Indiana have for developers to create less impervious developments? Because basically, right now, you're preaching to the choir. The people who need to be reached are the developers and engineers who are providing the information, creating these areas. How do you respond to that?

Answer:
Cluster planning is one of the big cries from the landscape architects. This will win over your engineers. Rather than spread the facilities further and further apart, bring things into a tighter, more structured setup; vertically rather than horizontally. And you can reduce the amount of impervious surface. You reduce your cost because you're clustering your materials and your outlay. If you improve your esthetics, surprisingly, people are prepared to pay a little more dollar for something with more quality that's esthetically pleasing. And let's say that gardens, lawns, and some natural surfaces are now esthetically pleasing–people will pay for that rather than just have large streets of strip malls and impervious surfaces. Coming from many different areas of the world, I'm really surprised that parking lots here are just a flat expanse of asphalt. In summer, it's incredible. You can measure the heat difference when you walk out onto that surface in the middle of summer. And the cars sit there and they just cook. And children and dogs could die in situations like that. It's really disastrous. Why don't people plant trees in parking lots? You see

cows in a field, you put a tree in the field, and the cows go into the shade. Human beings are exactly the same.

[New Speaker]
A couple of thoughts came to mind. I don't think there are any government incentives on it, but there are a few programs that clever consultants and developers are actually convincing industries and developers to go with, like the Classified Forest and Classified Wildlife Habitat programs. There are some communities that are building into their community a lot of open space and then they can reduce the taxes through conservation easements and classification of habitat. And I know the Division of Forestry works on urban forestry programs and has provided lots of trees to certain communities. There are some of those kinds of things happening, but I don't think there are any direct government incentives.

[New Speaker]
The city of Chicago basically mandates that every parking lot built today has to have a certain percentage of trees. And to take care of the birds' pooping problem, black locust trees are planted because they don't attract many birds, but they do provide some shade. So actually, people don't like black locusts, but they do serve a purpose in that situation. And they're very good as airport trees, if you have to have trees in your airports. But the DNR also pushes for open space projects as well. They don't have any enforcement for that, but they push those along. I hope that is what is going on here in Indiana as well.

Ed Squiers
It seems like one of the issues though, is that you're far beyond the 20% impervious surface before the public wants to do something. That may be the other group, and–that may be a result of education that's been imperfect. We name the engineers and the people paying the bills and the government, but the client–the public–very often would rather park their cars closer to the Wal-Mart than have a tree in the parking lot. And that seems to be an education problem. That goes deeper than any of these issues. I don't know. Maybe we have a chance on the Web to play with that a little bit over time. But just to give you an example, 3 or 4 years ago, we built a brand new environmental center at Taylor University. Wonderful building. I wanted to put a prairie around it, a restored prairie, a natural community. But the provost said "no we're not, we're going to have a parking lot, and we're going to have mowed lawns." And I said, "no, we're going to have a prairie." And he said, "Do you want this environmental center?" And so we have a parking lot which, by the way, is not square. And the provost continually gets complaints from our maintenance department every time they have to plow the parking lot. It takes them so much longer than it would if it were just a big chunk of square concrete. How do you get past that? The students complain because I strung the parking lot away from the building. They would rather park alongside the building. They are quite angry when they have to come in and they're a little bit wet. I try to explain to them that if they were at IU or Purdue or Ball State or somewhere, they'd have to park 2 miles from the building. They don't believe that. But that's what you run up against, and I think it's the typical kind of practical things that make it difficult. Somebody

has to mandate, or the public has to be very well educated and demand it. What seems like a grand idea in this group, is very difficult to sell to a group of legislators. It's rough. There's a big job ahead. And to do it before we reach 20% in urban areas.

Question:
Well, I happen to like streets. But in part, that's a human value. There's another part of science too. My question relates to the human value. When you're doing any functional assessment, you try to keep it as scientific as possible, but it's hard to keep out some of those other biases. My question to the panel is, where do you want to see human biases creeping into those assessments?

Dan Smith
Well, we say we draw the line here, and here are the facts, but of course, just in selecting which functions you decide to evaluate, you impart some bias, in my opinion. So we try to get around that by selecting a suite of functions that is representative of all the ecosystem processes that take place for that wetland. Well, that helps get around that subjectivity. But there is definitely implicit value in the selection of function process in HGM. Why don't we select for functions that are more global in nature? Because the whole climate changes, things like that. Well, you don't find functions being identified such as the amount of carbon being maintained in the site or something like that, because that's a world problem, not a community problem. The scales, the hierarchy of functions is important, and I think the reason why we end up where we end up, is implicitly because of what we value.

Tom Danielson
In bio-assessments, probably the most common way that it sneaks in, is when trying to select what attributes you're going to measure–your metrics. And we've done some really interesting exercises where you get some data and you get a group of ecologists in a room, and you say "okay, now what should we measure?" and each person has their favorite little critter that they want to measure and want to have in the list. And that list rapidly grows, from a short list of 8 to 12 things, to 50, 60, 100 different things you need to measure. The major thing to keep in mind with the biological systems is that we're only interested in finding those things that will show that consistent relationship with human degradation in some way. So you just have to keep refocusing. You don't have to measure everything. Biologists and ecologists want to know everything. We don't have to measure everything. We only have to know enough to show a change in condition.

Question:
I hope you're here tomorrow, because there are some of us who think that value should be a part of an evaluation methodology. Today we really haven't seen it outside of the forum being presented. Tomorrow we might get a different perspective on value and figure out your evaluation methodologies.

Dan Smith
Be careful now. If I gave the impression that I think that values should not be part of the evaluation or assessment process, that's not what I meant. What I mean is I think that they should be distinct and separate. They each have their own place, but they're both necessary for doing a full and complete assessment, no question about it.

Question:
Dan, I was going to ask you about the future of HGM. From what you spoke about this morning, it sounds like the waterways and experiment station will develop regional models and then, if I understand you correctly, they will back off and let the states, local governments, universities, or whoever develop the specific ones they need to do the work in their area. Would that be what you were saying?

Dan Smith
Yes. There are maybe 2 ½ people that actually work on this at the waterways and experiment station. It's rapidly gotten out of control in terms of our ability to monitor it. So we've basically put seed monies in a lot of initial efforts, and we've leveraged that money in many cases with statewide conservation grants already in existence with the EPA. We've also been involved in the establishment of teams, regionally and locally. But yes, this thing is developing a life of its own, and we're backing off of trying to focus more on the guidelines for developing regional guidebooks. We're trying to give guidance about our experience. What have we learned? What are the things we have decided that are important?" We're trying to put that out, but in terms of us actually doing the development of regional guidebooks–I have my pet 1 or 2 that I actually work on, but it's really gone out to a lot of different people that are involved in this now. If you want to go to Montana, I can tell you who to contact in Montana. So there's a lot of regional effort going on, independent of "waterways." We will continue over the next 5 years to put money into the startups for new regional guidebooks that people think are important. I think we have level funding to put into that.

Question:
How much of a limitation in your particular metrics, is technology or degree of difficulty of measurement? For instance, if chironomids were easy to identify, would that have been a better metric than the other ones we have?

Anna Hicks
Chironomids themselves are a wonderful piece of science if you can go down to the species level, because within the chironomids, you're not focusing on one group. You've got very tolerant groups, very intolerant groups, and even groups we know that perform differently under different regimes, and even under different toxicity levels. They're so specific. But that's not the case. So, we're coming back, with the EPA we really feel we're getting a handle on the important ones to go for. This is what we're agonizing over–we don't want to put something in there just because it might be a good idea. We really try to say, no matter what's literally in the wetland, if

we look at these metrics we know that they're consistently valuable to do an overall biological assessment. We know it's difficult to do chironomids, so we don't suggest doing them. There are other variables like that, that even though we know the science is good, it's not applicable to asking people to do it, unless they are going to do pure science on a good budget. We're trying to get over that pure science on a wonderful budget, it's just unreal, anymore, and come to something that people can grapple with, that we can spread much further afield and still come to good decisions.

Tom Danielson
There are some groups which are oversampling. They're sampling 6 times a year and they're keying everything down to species. They're trying to get an idea of how much information they lose if they cut back to genus or family. So I think we'll get a good idea from some of those projects, as to how important it is to cut down. Also, the EPA is going to be funding some regional taxonomic key development to help tackle some of those different key-out things, where you really lose a lot of information if you don't go down to that next level. But that's certainly something to consider. If you don't want to spend all your time and money and effort on one thing, when you could go and find something a little rigorous and do more wetlands, for that same amount of money and effort. It's a balancing act.

Question:
Some of the questions asked earlier were about less funding in the development of guidebooks for the next 5 years of having funds to support that. Does that include funding for positions? How much funding are we talking about?

Answer:
Well, the budget for the last couple of years has been around $1.5 million. That goes to 3 basic areas; to clubbing projects for development and redevelopment projects; to research, which really ends up being validation of existing laws and guide books; and to answering this question of "okay, you've got your results, what do you do with them now? And that is looking strongly at the different ways to approach litigation. So the levels are going to be low for new starts over the next 5 years–about a million dollars a year. We haven't had any trouble getting rid of that–there are enough people out there that are interested.

Question:
In Indiana, how are wetlands designated, what designations do you use? I'm just curious what level of protection you have in the wetlands.

Answer:
In other words, in our state water quality standards, are wetlands given special protection? No. Not at this time. Right now, the state is going through its triennial review of state water quality standards, and wetlands are way down on the list. There is much more interest in the point source discharges. I understand that it is coming up to where it is at least on the agenda. I know they

work extensively with external work groups and this process and most of which are related to dischargers specifically, and I don't know what interest that there is going to be out there from folks who are interested in the development of specific directives, if you will, for wetland protection. But we'd certainly like to see movement in that direction. It's coming hopefully– when, we're not entirely sure.

Question:
Question for Anna: Based on your work, how did you arrive at a standardized sampling to cross through the wetlands? There has to be some common knowledge to go to, to check this kind of place in each wetland so that you got some sort of a standard.

Anna Hicks
I know what your getting at, and you're going too fast. Don't try to compare a marsh with the forested wetland. Don't try to do something like that. If you have very dominant types of vegetation in a wetland system, you really have different types of wetlands within that system. Measure each type of wetland against a reference type wetland, but don't try to say, "I want my vegetation to have this diversity, this type, this structure if I have this water level saturation." You can't stay energized. That's ecology, that's reality. Otherwise you'd go crazy.

Question:
Now, what engineer would accept that as an answer? The same wetland at various sampling points, but different scores.

Answer:
Once again, I think that the overall ICI is the answer. It's the final score, no matter what. If I've got a marsh wetland type in one area and maybe a bulk wetland in another area, you can't have these sorts of variations. You will still have a certain number of organisms, you will still have a diversity of organisms, you will still have tolerance and intolerance. You will still have predators or you won't have predators, and you would probably still have balances or imbalances in your tropic conditions. So these are very generalized words. We don't have to look specifically at species. And even coming to a family level, sometimes you can't actually compare a marsh community to a certain degree with a slightly different one. And if we look at the families, what do the families tell us? In general terms they can tell us an awful lot. You will see the same family in both those different environments. Within a wetland system. And we're playing a little dangerous game, but what you lose is compensated for by what you win by being able to generalize and not worry about tiny details. This is extremely valuable in being able to make an overall assessment of general health. So we try not to worry too much about little things. I'm not looking specifically or literally right down to the tiniest detail of what I see. I'm generalizing out so I can make a judgement.

Question:
In our larger biological assessments of wetlands we have focus groups for each assemblage, and they try to tackle that idea of where to sample. Let's say that you just have a depressional marsh with some submerged vegetation and some emergent vegetation. Where do you take your few samples, and what sampling method do you use in each of those areas? In some cases they'll just get this big metal box, plop it down, push it a little bit into the substrate and in that fixed area you then get everything in the water column, various plants and things in the substrate. You close the box, pick it up and go and sort it. It's a pain to sort, but that's one method they're trying.

Answer:
You get a lot for every sample that you take, and it's a good one. So there is a variety of ways to do this. We will hopefully be putting out some short facts sheets, for lack of a better word. I have some of the things we've been talking about, each of those focus groups, so this should be going up on our Internet site.

Question:
Another thing that relates to that, as well, is just how you accomplish what some call single visitations. We've talked about the sample nature, we've talked about the need to maintain some temporal standards, but how confident can we be with minimum visitations with regard to what we're measuring?

Answer:
Yes, that's another big one we're tackling in the work group. And what they're doing now is in a development stage. They're over-sampling, knowing that they're going to over- sample. Different times of the year. We'll say that if we only look at this time of year, we can detect an impairment, and if they can consistently show with only one sample at a certain time of year, then maybe that's good enough. And so I don't have an answer. It gets real complicated real fast.